

REMARKS

As filed, this application contained 68 claims. In response to the restriction requirement, claims 47 – 68 have been cancelled, without prejudice. In addition, claims 1, 13, 24, 38, 44, 45 and 46 have been amended and claims 69 – 82 have been added. Claims 1 – 46 and 69 – 82 are currently pending in the present application. The application has been reviewed in light of the Office Action mailed August 24, 2005. Reconsideration of the pending claims of the application is respectfully requested in light of the amendments and the following remarks.

The office action contains a restriction requirement dividing the claims into two groups for examination purposes. Group I includes claims 1 - 46 and are drawn to an integrated circuit, classified in class 257, subclass 328; and Group II includes claims 47 – 68 and are drawn to a method of forming a substructure, classified in class 438, subclass 212. In accordance with the provisional election made during a telephone conversation on August 4, 2005, Applicants elect Group I, claims 1 – 46. Claims 47 – 68 have been cancelled in this amendment without prejudice.

Claims 24-37 stand rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention. In particular, the office action states that claim 24 is unclear as to whether an extension of the trench or the base layer is below the substrate. Claim 24 has been amended for clarification. The 35 U.S.C. 112, second paragraph, rejection is now inapplicable to claims 24-37 in light of the amendment to claim 24.

Claims 1, 12 – 14, 23 – 26, and 29 – 30 stand rejected under 35 U.S.C. 102(e) as being anticipated by Clevenger et al. (US 2004/0227061 A1). Independent claims 1, 13,

and 24 have been amended. The 102(e) rejection of claims 1 and 12 is now inapplicable in light of the amendment to claim 1. The rejection should be withdrawn.

Specifically, claim 1 recites an integrated circuit comprising a trench structure, "wherein said trench structure has a top width and a base layer width and the base layer width is smaller than the top width." Clevenger, which discloses a trench with perpendicular sidewalls for directing light to a desired area (see Figure 7), fails to disclose the claimed trench structure. As such, claim 1 and dependent claim 12 are allowable over Clevenger.

Claim 13 similarly recites a trench that "includes a top width and a base layer width where the base layer width is smaller than the top width." Accordingly, the 102(e) rejection of claims 13, 14 and 23 is now inapplicable for at least the reasons set forth above. The rejection should be withdrawn. Claim 24 as amended recites "at least one trench of the plurality of trenches includes a top width and a base layer width where the base layer width is smaller than the top width." As such, Applicants respectfully submit that the 102(e) rejection of claims 24 – 26 and 29 – 30 is now inapplicable for at least the reasons set forth above and on their own merits. The rejection should be withdrawn.

Claims 2 – 4, 11, 18, 37 and 44 – 45 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Clevenger et al (US 2004/0227061 A1) in view of Rhodes (US 2003/0089929 A1). Independent claims 1, 13, 24, 44 and 45 have been amended. The 103(a) rejection of claims 2 – 4, and 11 are now inapplicable in light of the amendment to claim 1 for at least the reasons set forth above. The rejection should be withdrawn. Claim 18 depends from claim 13. Applicants respectfully submit that for at least the reasons set forth above the 103(a) rejection of claim 18 is now inapplicable in light of the amendment to claim 13. The rejection should be withdrawn. Claim 37 depends from

claim 24. Applicants respectfully submit that for at least the reasons set forth above the 103(a) rejection of claim 37 is inapplicable in light of the amendment to claim 24. The rejection should be withdrawn. Claim 44 has been amended to recite "the at least one trench includes a top width and a base layer width where the base layer width is smaller than the top width" and claim 45 has been amended to recite "the at least one trench includes a top width and a base layer width where the base layer width is smaller than the top width." As set forth above, the cited art fails to disclose the claimed features of claims 44 and 45. The 103(a) rejection of claims 44 and 45 are inapplicable in light of the amendments to those claims. The rejection should be withdrawn.

Claims 5 – 6 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Clevenger et al. (US 2004/0227061 A1) and Rhodes (US 2003/0089929 A1) as applied to claims 1 and 12 – 13, further in view of Yoshinori (JP PAT-NO 363009968 A). Claims 5 and 6 depend from claim 1, which is allowable over Clevenger for at least the reasons set forth above. Rhodes and Yoshinori fail to cure the deficiencies of Clevenger. Accordingly, the 103(a) rejection of claims 5 and 6 is now inapplicable and should be withdrawn.

Claim 28 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Clevenger et al. (US 2004/0227061 A1) as applied to claims 1, 12 – 14, 23 – 26, and 29 – 30, and further in view of Yu et al. (US 6,225,171 B1). Claim 28 depends from claim 24 and is believed to be allowable for at least the reasons set forth above and on its own merits. Accordingly, the 103(a) rejection of claim 28 is now inapplicable and should be withdrawn.

Claims 38 – 39 and 43 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Clevenger et al. (US 2004/0227061 A1) in view of Fossum (US

2004/0195592 A1). Claim 38 recites a trench that "includes a top width and a base layer width where the base layer width is smaller than the top width. Accordingly, for at least the reasons set forth above, the 103(a) rejection of claims 38, 39 and 43 is now inapplicable. The rejection should be withdrawn.

Claim 40 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Clevenger et al. (US 2004/0227061 A1) and Fossum (US 2004/0195592 A1) as applied to claims 15 – 16 and 27, and further in view of Yoshinori (JP PAT-NO 363009968 A). Claim 40 depends from claim 38, which is believed to be allowable for at least the reasons set forth above. Accordingly, the 103(a) rejection of claim 40 is now inapplicable in light of the amendments to claim 38. The rejection should be withdrawn.

Claims 41 and 46 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Clevenger et al. (US 2004/0227061 A1) and Fossum (US 2004/0195592 A1) in view of Rhodes (US 2003/0089929 A1). Claim 41 depends from claim 38 and is allowable for at least the reasons set forth above. Claim 46 recites a trench that "trench includes a top width and a base layer width where the base layer width is smaller than the top width." As such, the 103(a) rejection of claims 41 and 46 are now inapplicable in light of the amendments to claims 38 and 46 respectively.

Claims 2 - 6, 11, 15 - 18, 27 - 28, 32, 37 - 41, and 43 - 46 stand rejected under 35 U.S.C. §103(a) as being nonpatentable over Clevenger et al (US 2004/0227061 A1) with various combinations of art. Applicants traverse these rejections for the reasons below.

MPEP §§ 2142, 2143 provide guidance on §103(a). According to § 2142, "the examiner bears the initial burden of factually supporting any prima facie conclusion of obviousness." Section 2142 further states that in view of all the factual information,

“the examiner must then make a determination whether the claimed invention ‘as a whole’ would have been obvious.”

This section also states that knowledge of Applicant’s disclosure must be put aside in reaching this determination and acknowledges that the tendency to resort to “hindsight” based upon Applicant’s disclosure is often difficult to avoid. This section cautions that impermissible hindsight must be avoided and the legal conclusion must be reached on the basis of the facts gleaned from the prior art. See MPEP § 2142.

MPEP § 2143 delineates the three criteria for establishing a *prima facie* case of obviousness as: 1) there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings; 2) there must be a reasonable expectation of success; and 3) the prior art reference (or references when combined) must teach or suggest all the claim limitations. The Office Action has failed to make a *prima facie* case of obviousness for claims 2 - 6, 11, 15 - 18, 27 - 28, 32, 37 - 41, and 43 - 46 under the MPEP in that it does not satisfy, *inter alia*, at least the first two criteria.

In each of these rejections the office action has failed to address the first two criteria for establishing a *prima facie* case of obviousness, namely, the suggestion or motivation to combine the reference teachings and the reasonable expectation of success of the combinations. In some cases, it is unclear that the references could be combined and the references teach away from the combinations sought by the examiner. For example, the Clevenger reference (US 2004/0227061) (the “’061 publication”) includes sidewalls of trenches that are perpendicular to the surface of the photodiode that receives incident light. Abstract, and paragraphs 12, 15, 16, 36, 37, 38, 62, 65 and 66. Throughout the ‘061 publication the importance of perpendicular relationship between the sidewall of the trenches and the surface of the photodiode that

receives the incident light is emphasized. Conversely, U.S. Patent No. 6,225,171 (the "'171 patent") includes sidewalls of their shallow trenches which are not perpendicular to the surface of the photodiode that receives incident light. Each of the cross sectional diagrams included within the patent (Figs. 1a – 1f) depict this non-perpendicular relationship between the sidewalls of the trenches and the surface of the photodiode that receives incident light. Additionally, the '061 publication discusses the addition of deep trenches separating the cores while the '171 patent discusses shallow trenches for isolation.

Claims 7 – 10, 19 – 22, 31, 33 – 36 and 42 stand objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. These claims have been rewritten as new claims 69 – 82.

In view of the above amendments and remarks, applicant believes all pending claims of the current are in condition for allowance. Applicants request the examiner allow the pending claims and pass this application to issue.

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Respectfully submitted,

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